

## VALVE ARRANGEMENT FOR CONTAINER FILLING MACHINES

### BRIEF SUMMARY OF INVENTION

This invention relates to filling machines of any type wherein filling of successive containers is to be effected successively from a common filling source during travel of the containers on appropriate conveyors through the machine. In effecting the fill of the containers, filling spouts are introduced into the open mouths of the successive containers. Each spout includes a rotary type of valve movable from a normally closed condition to an open condition after the spout has been introduced into the container to be filled. To this end, a lever is associated with each valve which lies normally in an inoperative position and which is moved to an operative position by the container itself upon introduction into the latter of this spout for filling. Subsequently, the lever while in its operative position is acted upon by cam means in its path of travel to rotate the valve to an open condition for effecting filling of each particular container. Sensing means responsive to level of fill of the liquid in the particular container acts on the lever when desired fill level is achieved to restore the valve to its closed condition or a further cam performs this function if the sensing means fails. Thereafter, on removal of the container from the spout, the lever itself returns to its normally inoperative position so that unless a successive fresh container moves it again to operative position it will not reopen its associated valve. Thus, the arrangement prevents inadvertent opening of a valve and consequent waste of filling fluid unless a container is in a position to receive fill flow from the spout inserted into it. The presence of a container is necessary to move the lever to an operative condition and absence of a container will, therefore, prevent opening of the particular valve associated with its spout and avoid waste of fill fluid. Return flow to the source of fluid from an unopened valve is provided. In the case of pressure fill, a special bypass arrangement is provided to avoid excessive pressure buildup during fill in the event that one of the valves fails to open when no container appears beneath its spout for filling.

Objects and features of the invention are to provide fluid-filling machines with the novel valving arrangement above mentioned that will be simple, effective in operation and which may be produced at relatively low cost.

Other objects and features of the invention are the provision of novel filling flow control whose operation is initiated by the presence of a container in position to receive fill flow and whose absence will prevent initiation of fill flow together with means to cut off flow upon completion of fill as well as to provide, if desired, control of the rate of fill flow during filling.

Further objects and features of the invention are to provide bypass means in conjunction with the valve to permit return flow to the filling source of fill from an unopened valve.

Other objects and features of the invention will become apparent from the following detailed description and the accompanying drawings forming part hereof wherein:

FIG. 1 is a schematic plan view of a rotary filling machine embodying the invention;

FIG. 2 is a sectional view of a rotary filling valve and its operational control in the closed condition of the valve;

FIG. 3 is a similar sectional view showing the valve in its open filling condition;

FIG. 4 is a sectional view of a modified form of rotary filling valve and its operational control in the closed condition of the valve used particularly with a pressure filling system, and

FIG. 5 is a similar sectional view of this embodiment in its open filling condition.

### DETAILED DESCRIPTION

Referring now to the drawings and first to FIGS. 1—3, 10 denotes generally a filling machine which embodies a rotary conveyor 11 mounted for rotation on a vertical shaft 12 driven in any suitable manner in the direction of the arrow A in FIG.

1. Containers C to be filled are delivered for entrainment on the conveyor 11 from a feed conveyor 13 via a star wheel 14 which delivers the successive containers in timed, properly spaced sequence onto successive vertically movable platforms 15 forming parts of the rotary conveyor 11 and which may be elevated respectively in any suitable manner after delivery thereon of a container C and maintained in elevated condition during container filling and subsequently lowered for enabling removal from the rotary conveyor 11 of filled containers as by a second star wheel 16 which, in turn, acts successively on the filled containers to deliver them to a removal conveyor 16'.

A circular body (FIGS. 2 and 3) 17 is keyed for rotation with shaft 12 in synchronism with the rotary conveyor 11 and is positioned in spaced, overlying vertical relationship therewith. This body 17 carries a plurality of arcuately equispaced valve retaining members 18 which correspond in number to the said vertically movable platforms 15 and are respectively vertically aligned therewith.

Each valve retaining member 18 is provided with a vertical bore 19. A radially extending inlet passageway 20 as well as radially extending outlet passageway 21 in body 17 as seen in FIG. 2 can communicate via bore 19 in the position shown in FIG. 2 of a rotatable cylindrically shaped valve body 22 as described in more detail below. These passageways 20 and 21 in turn extend through body 17 and communicate respectively with outlet and inlet openings (not shown) of a reservoir (not shown) for filling fluid designed to be fed by gravity for filling.

One rotatable cylindrically shaped valve body 22 is mounted in the bore 19 of each member 18. Each such body 22 has an axially directed passageway 23 in the lower portion of its length which has a lateral opening 24 (FIG. 3) which may be rotated into and out of registry with inlet passageway 20 by proper rotation of valve body 22 as will be described.

Each such valve body 22 bears externally a sealing sleeve 25 of appropriate sealing material to prevent leakage. This sleeve 25 in turn has a port 26 in registry with lateral opening 24 and the sleeve 25 is rotatable together with valve body 22 so that when the latter is rotated from the position of FIG. 2 to that of FIG. 3, both the port 26 and the opening 24 may be brought simultaneously from out of registry with inlet passage 20 into registry therewith as seen respectively in FIGS. 2 and 3. Body 22 and sleeve 25 also have aligned vertical slots 22' and 25' therein phased approximately 90° from port 26 and opening 24 which, in the closed position of said body, seen in FIG. 2, provide bypass intercommunication between flow passages 20 and 21.

Each such valve body 22 is provided with an annular external flange 27 that rests upon an O-ring seal 28 on the upper surface of its retaining member 18 being maintained in sealing relationship therewith as by a retainer 29.

A solid extension 30 extends upwardly of each such valve body 22 above flange 27 through the retaining member 29.

A tubular spout 31 carried by a sealing plug 32 is fitted into the axial passageway 23 at the lower end of each such valve body 22 with a conventional O-ring seal 33 between the lower end of said body 22 and a flange 34 of said plug 32.

A retaining cuplike part 35 having a threaded opening 36 in its lower end is secured to the under face of each valve retaining member 18. A tubular securing body 37 having a threaded upper end 38 is screwed into threaded opening 36 to tighten plug 32 into place and effect a seal at O-ring 33 as well as at a second O-ring 39.

The spout 31 extends axially through and below the lower end of securing body 37. The bore 40 of securing body 37 has an enlarged diametere portion 41 adjacent its lower end into which an overflow tube 42 is mounted. This overflow tube 42 has larger diameter than the external diameter of spout 31 to provide an annular overflow passageway 43 surrounding the lower end of spout 31. The overflow passageway 43 opens at its upper end into an overflow chamber 44 provided with a lateral opening 45 with which a fill sensing system 46 to be described may be connected.